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Rubber Manufacturers Association Meeting with the U.S. Environmental Protection Agency

April 7, 2016

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RMA Tire Company Members

BRIDGESTONE
PASSION for EXCELLENCE



Continental

PIRELLI


COOPER TIRES

TOYO TIRES
driven to perform®

GOODYEAR
Get there™

 **YOKOHAMA**



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Objectives

- Provide an overview of the industry (production, sales, trends)
- Provide an overview of Tire Manufacturing, Performance Regulations, and Scrap Tire Markets
- Tire Care and Maintenance
- Additional Resources - Tire Industry Project
- Open a dialogue with EPA on crumb rubber used in synthetic turf


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2015 U.S. Tire Shipments

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2015 US TIRE INDUSTRY ACTIVITY Shipments (in thousands of units)						
	2014		2015		% change 15/14	
	Total	Radial	Total	Radial	Total	Radial
Passenger						
Industry Original						
Equipment	47,788	44,608	49,708	46,458	4.0%	4.1%
Industry Replacement	206,491	204,221	206,147	205,887	-0.2%	0.8%
RMA Exports	25,255	25,255	25,783	25,783	2.1%	2.1%
Total Passenger	279,534	274,084	281,638	278,128	0.8%	1.5%
Light Truck *						
Industry Original						
Equipment	4,630	4,630	4,373	4,363	-5.6%	-5.8%
Industry Replacement	28,681	28,555	29,143	29,040	1.6%	1.7%
RMA Exports	5,264	5,264	5,404	5,404	2.6%	2.6%
Total Light Truck	38,575	38,449	38,919	38,806	0.9%	0.9%
Truck & Bus **						
Industry Original						
Equipment	5,686	5,686	6,203	6,193	9.1%	8.9%
Industry Replacement	17,434	17,058	17,908	17,633	2.7%	3.4%
RMA Exports	2,352	2,352	2,480	2,480	5.5%	5.5%
Total Truck & Bus	25,472	25,096	26,591	26,306	4.4%	4.8%

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Production & Imports (in thousands of units)						
	2014		2015		% change 15/14	
	Total	Radial	Total	Radial	Total	Radial
Passenger						
RMA Production	121,028	121,028	126,143	126,143	4.2%	4.2%
US Imports	148,800	142,486	147,770	143,789	-0.7%	0.9%
Light Truck *						
RMA Production	26,076	26,076	26,441	26,441	1.4%	1.4%
US Imports	26,077	25,936	24,457	24,362	-6.2%	-6.1%
Truck & Bus **						
RMA Production	14,491	14,491	14,823	14,823	2.3%	2.3%
US Imports	13,170	12,649	14,423	13,920	9.5%	10.0%



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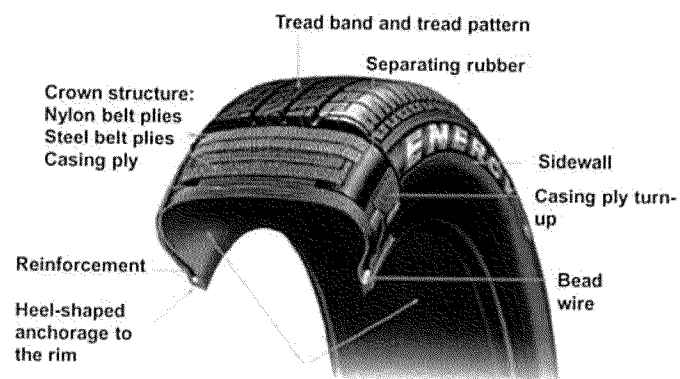
How are tires made?

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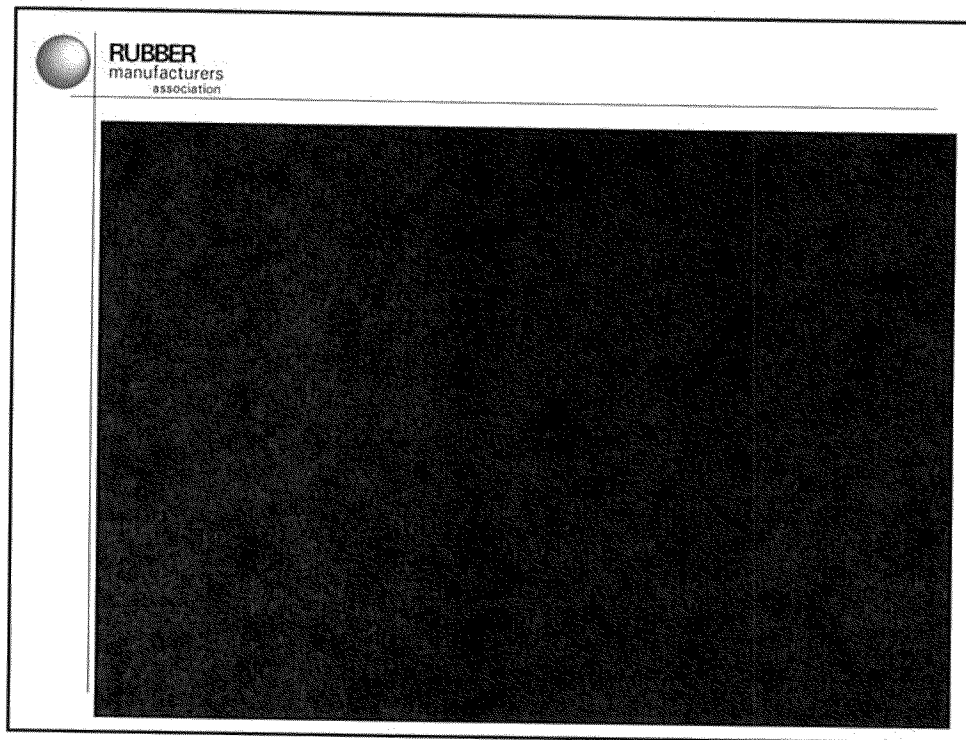



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Tires are highly engineered products



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Tire Manufacturing Processes

- Processes:
 - Mixing
 - Calendaring
 - Extruding
 - Process Temperature for Mixing, Calendaring and Extruding ranges from 176 – 248 Degrees Fahrenheit
 - Tire Building
 - Tire Curing
 - 302 – 356 Degrees Fahrenheit

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Rubber Vulcanization – Tire Curing

- Vulcanization
 - Changes the chemical composition of the chemicals formulated into the tire in the initial stages of the manufacturing process
 - Crosslinking of elastomer chains in a rubber compound
 - Combination of elastomer (double bonds), temperature, time and crosslinking agent
 - Provides final properties (strength, elasticity)

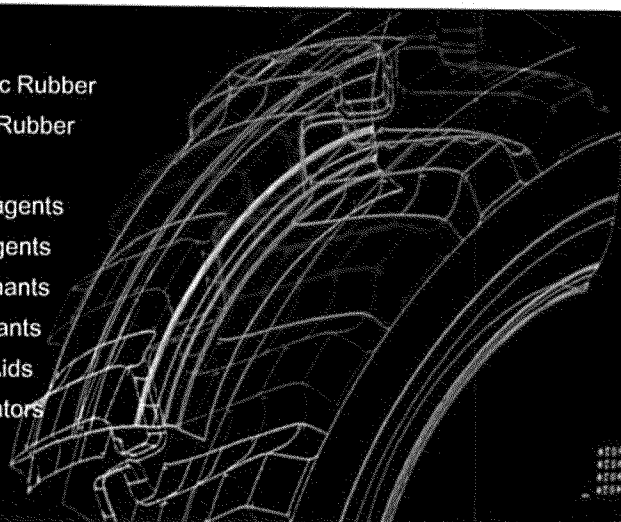
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Raw Materials used in tires

- Elastomers
 - Synthetic Rubber
 - Natural Rubber
- Fillers
- Vulcanizing agents
- Protection Agents
 - Antiozonants
 - Antioxidants
- Processing Aids
 - Accelerators
- Metal
- Textiles



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Scrap Tire Constituents

Constituent	% by weight
Natural Rubber	24%
Synthetic Rubber	19%
Steel	16%
Textile	3%
Filler	26%
Antioxidants, Antiozonants, Accelerators	12%
TOTAL	100%

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Safety is the Number One Priority

- Tires are highly regulated products to ensure consumer safety
- The National Highway Traffic Safety Administration (NHTSA) regulates new tires. The Safety Act, 49 U.S.C. §§ 30103-30105 et seq.

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Safety Act, 49 U.S.C. §§ 30103-30105 et seq.

- 49 CFR 571.109 - Standard No. 109; New pneumatic and certain specialty tires.
- 49 CFR 571.110 - Tire selection and rims and motor home/recreation vehicle trailer load carrying capacity information for motor vehicles with a GVWR of 4,536 kilograms (10,000 pounds) or less.
- 49 CFR 571.119 - Standard No. 119; New pneumatic tires for motor vehicles with a GVWR of more than 4,536 kilograms (10,000 pounds) and motorcycles.
- 49 CFR 571.120 - Tire selection and rims and motor home/recreation vehicle trailer load carrying capacity information for motor vehicles with a GVWR of more than 4,536 kilograms (10,000 pounds).
- 49 CFR 571.129 - Standard No. 129; New non-pneumatic tires for passenger cars.
- 49 CFR 571.138 - Standard No. 138; Tire pressure monitoring systems.
- 49 CFR 571.139 - Standard No. 139; New pneumatic radial tires for light vehicles.

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Tire Care and Maintenance

- Consumers play an important role in maintaining their tires
 - Maintaining proper tire pressure
 - Rotating tires every 5,000-8,000 miles
 - Ensuring proper tread depth
- RMA advocates for tire safety through our Be Tire Smart Campaign
 - RMA Tire Care & Safety:
 - http://www.rma.org/wp-content/uploads/RMA_TireCareSafetyGuide_2013.pdf

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Scrap Tire Market Overview

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U.S. Scrap Tire Generation 2013

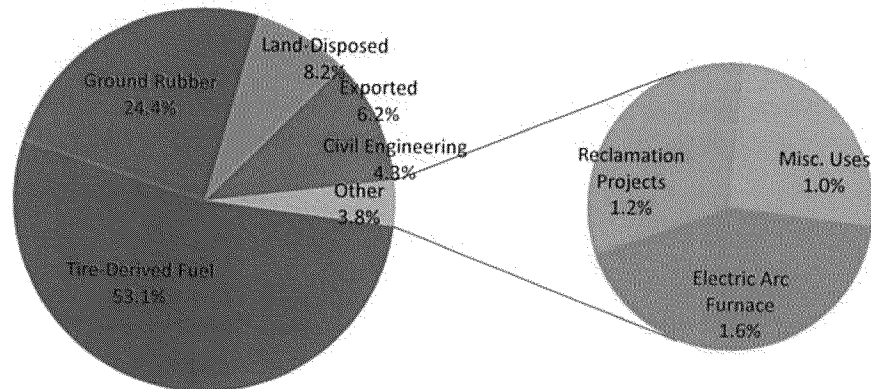
Tire Class	Millions of Tires	Market %	Average Weight (lbs)	Weight (thousands of tons)
Light Duty Tires	240.5	89.5%	22.5	2705.5
Passenger tire replacements ¹	199.3	74.1%		
Light truck tire replacements ¹	28.0	10.4%		
Tires from scrapped cars ²	13.2	4.9%		
Commercial Tires	28.3	10.5%	120.0	1700.4
Medium, wide base, heavy truck replacement tires ¹	15.7	5.8%		
Tires from scrapped trucks and buses ²	12.6	4.7%		
Total tires hauled	268.8	100.0%	32.8	4405.8
Used tires culled	35.5	13.2%	32.8	581.6
Net scrap tires	233.3			3824.3

¹Factbook 2014: U.S. Tire Shipment/Activity Report for Statistical Year 2013, Rubber Manufacturers Association.

²Ward's Motor Vehicle Facts and Figures, 2014. Includes the total number of vehicles removed from service in 2013. In 2013, Ward's did not publish vehicles retired from service separated for the car and truck/bus category. Instead, it only published total vehicles scrapped from service. RMA estimated the split between cars and trucks/buses based on the average of the split from 2002 - 2012. Assumes two tires scrapped from light duty vehicles and 2.5 tires scrapped from trucks and buses.

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U.S. Scrap Tire Disposition 2013 (percent of total tons generated annually)

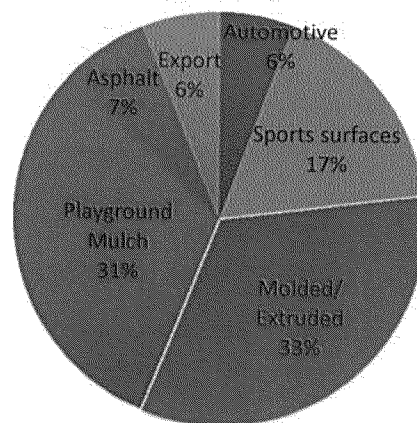


Numbers may not add due to rounding.

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U.S. Ground Rubber Markets 2013 (percent of total pounds of ground rubber consumed in market)



Did you know?

Total tire rubber consumed in ground rubber markets:
about 1,300,000,000 pounds

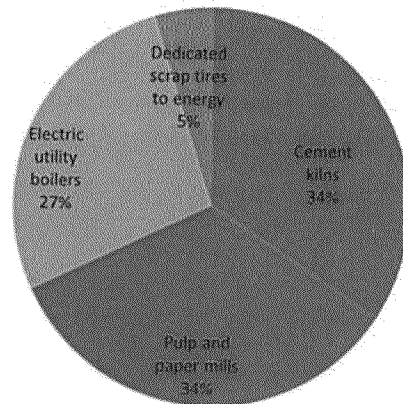
Total scrap tires diverted to these markets:
About 975,000 tons or almost 60 million tires

Please note: Ground rubber market distribution data are based on ground rubber consumed in end-use markets, not whole tires entering these market streams. The data represented in RMA U.S. scrap tire market summaries refer to the weight of whole tires diverted to all scrap tire markets, including ground rubber, whereas this chart refers to the weight of processed ground rubber, with wire, fluff and agglomerated rubber removed that is consumed in ground rubber end-use markets.

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U.S. Tire-Derived Fuel Markets 2013



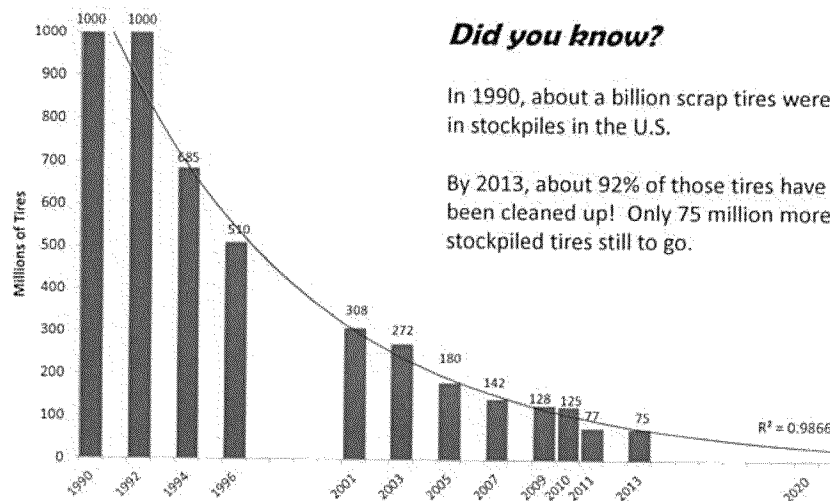
Did you know?

Total scrap tires diverted to TDF market:
2,120,300 tons or
almost 130 million tires

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U.S. Stockpiled Scrap Tires 1990 - 2013



Did you know?

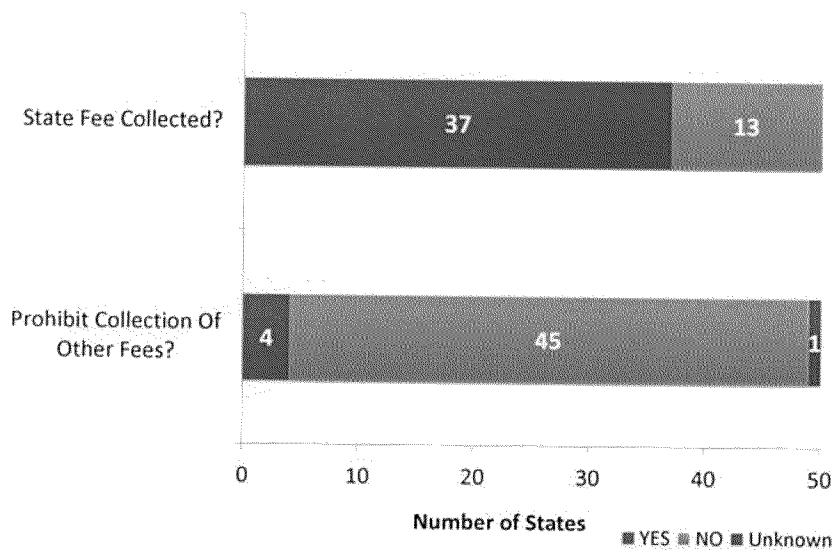
In 1990, about a billion scrap tires were in stockpiles in the U.S.

By 2013, about 92% of those tires have been cleaned up! Only 75 million more stockpiled tires still to go.

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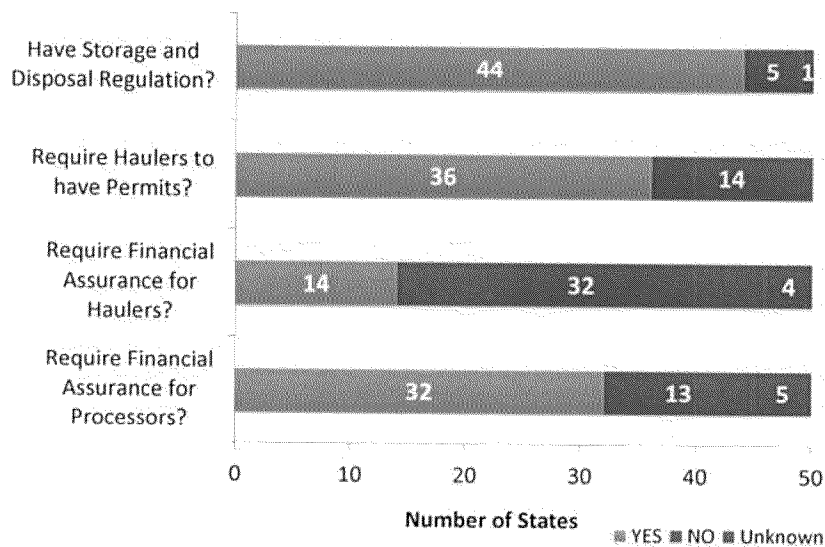
Overview of Current State Programs



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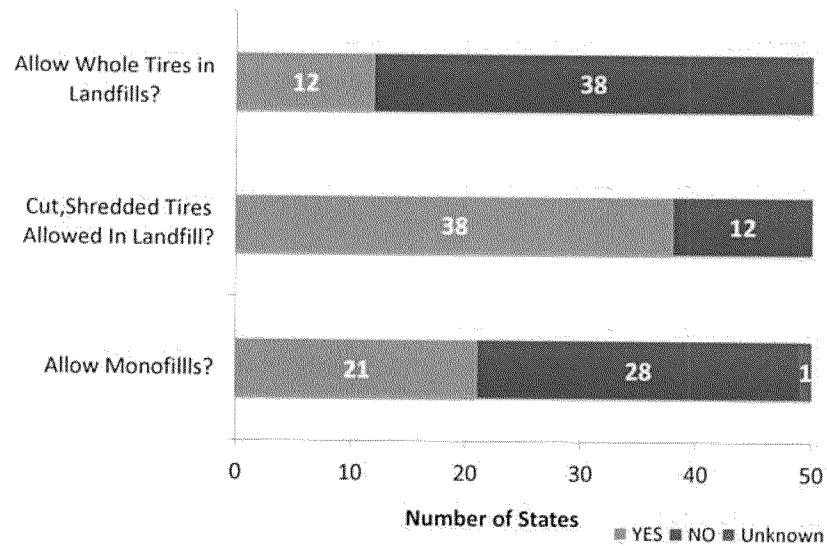
Overview of Current State Programs



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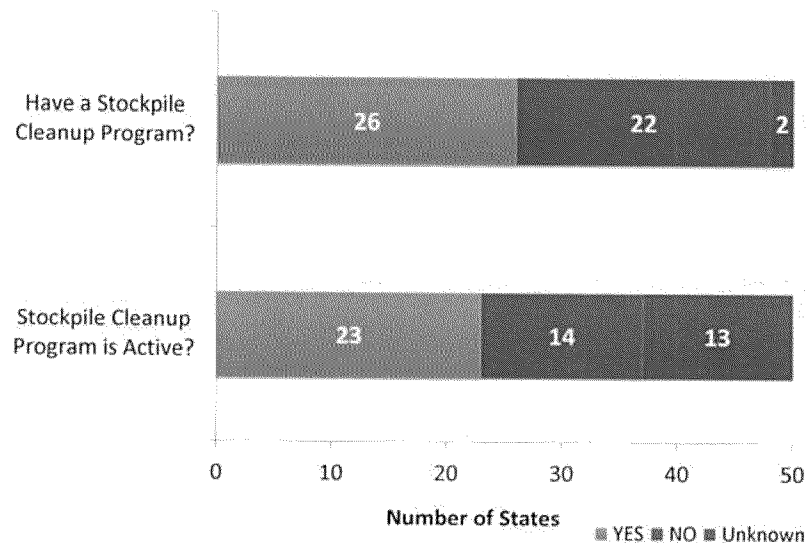
Overview of Current State Programs



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Overview of Current State Programs



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Tire Industry Project

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Tire Industry Project (TIP) Overview

- Geneva, March 2005: CEOs of major tire manufacturers established the TIP
 - Goal
 - Anticipate the potential long term environmental and health issues relating to tire materials and Tire & Road Wear Particles that could impact the tire industry globally
 - Guidelines
 - Environmental initiative must be neutral, global, scientifically valid, and reported directly to the CEOs
 - Organization
 - A sector-based project under the auspices of the World Business Council for Sustainable Development (WBCSD) (<http://www.wbcd.org/tires.aspx>)

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Tire Industry Project (TIP) Overview

- Since 2006, the Tire Industry Project (TIP) has initiated work in the following areas:
 - Evaluated chemicals commonly used in tire making for any potential health and/or environmental impacts;
 - Properties, fate and impacts of tire and road wear particles (TRWP) generated during normal tire use and wear;
 - Management of tires at the end of their useful lives (end-of-life tires or ELT); and
 - Safe development and use of nanomaterials in the tire industry.

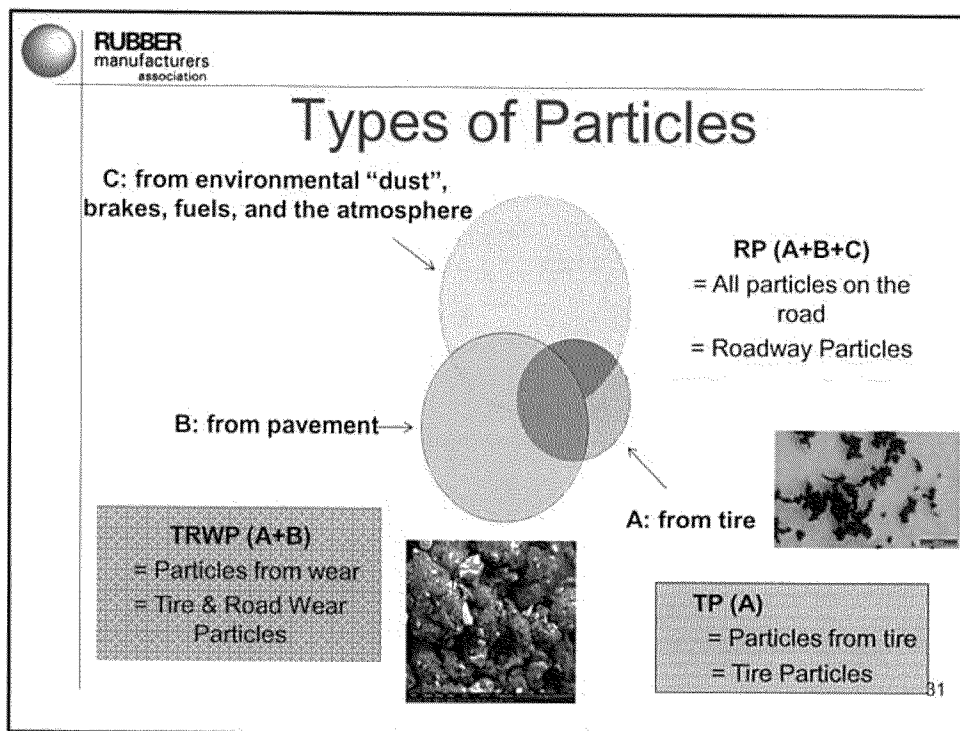
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Tire Industry Project Activities

- TRWP State of Knowledge Report (2008)
 - <http://www.wbcscd.org/Pages/Adm/Download.aspx?ID=67&ObjectTypeId=7>
- Identification of a tire marker for labeling and tracking particles in the environment (air, water and sediment).
- Global sampling in Europe, United States and Japan.
 - <http://www.wbcscd.org/Pages/EDocument/EDocumentDetails.aspx?ID=15829&NoSearchContextKey=true>
- Generation of tire wear particles (TWP) in a controlled laboratory environment.
- Assessment of human and ecological risk associated with TRWP in the environment.
 - <http://www.wbcscd.org/Pages/EDocument/EDocumentDetails.aspx?ID=54&NoSearchContextKey=true>
- Physical and Chemical Characterization of Tire-related Particles.
- Life Cycle: Environmental fate of organic chemicals in tire and road₃₀ wear particles.



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Tire Road Wear Particles:

- Comprised of rubber from the tire tread as well as embedded pieces of pavement.

Crumb Rubber

- Used in playgrounds and turf fields
- May be coated with antimicrobial, antistatic agents etc.

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Additional Resources

- Tire Industry Project
 - <http://www.wbcd.org/work-program/sector-projects/tires/tipfaq.aspx#q2>
- Carbon Black
 - <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4556099/>
- RMA Literature Review
 - [http://www.rma.org/download/scrap-tires/Environmental%20Issues/literature review 0813.pdf](http://www.rma.org/download/scrap-tires/Environmental%20Issues/literature%20review%200813.pdf)

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Thank you

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